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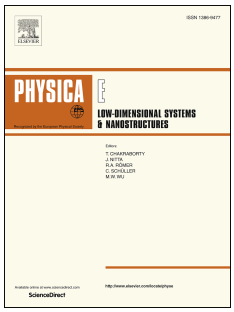

Convective heat transfer and pressure drop of TiO_2-water nanofluids at different diameters of nanoparticles: Data analysis and modeling with artificial neural network

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Convective heat transfer and pressure drop of TiO_2-water nanofluids at different diameters of nanoparticles: data analysis and modeling with artificial neural network

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Abstract

In this study, experimental data related to the Nusselt number and pressure drop of aqueous nanofluids of Titania is modeled and estimated by using artificial neural network with 2 hidden layers and 8 neurons in each layer. Also in this study the effect of various effective variables in the Nusselt number and pressure drop is surveyed. This study indicated that the neural network modeling has been able to model experimental data with great accuracy. The modeling regression coefficient for the data of Nusselt number and relative pressure drop is 99.94% and 99.97% respectively. Besides, it represented that the increment of the Reynolds number and nanoparticle volume fraction made the increment of Nusselt number and pressure drop of aqueous nanofluid.

Keywords: artificial neural network; TiO_2–water nanofluid; Pressure drop; Nusselt number; Nanoparticle diameter; Turbulent flow